



SAN MATEO CREEK BASIN

Ground Water Investigation

MAY 2016

Prewitt

Frontage Rd

509

605

San Mateo

547

122

40

Canyon Rd

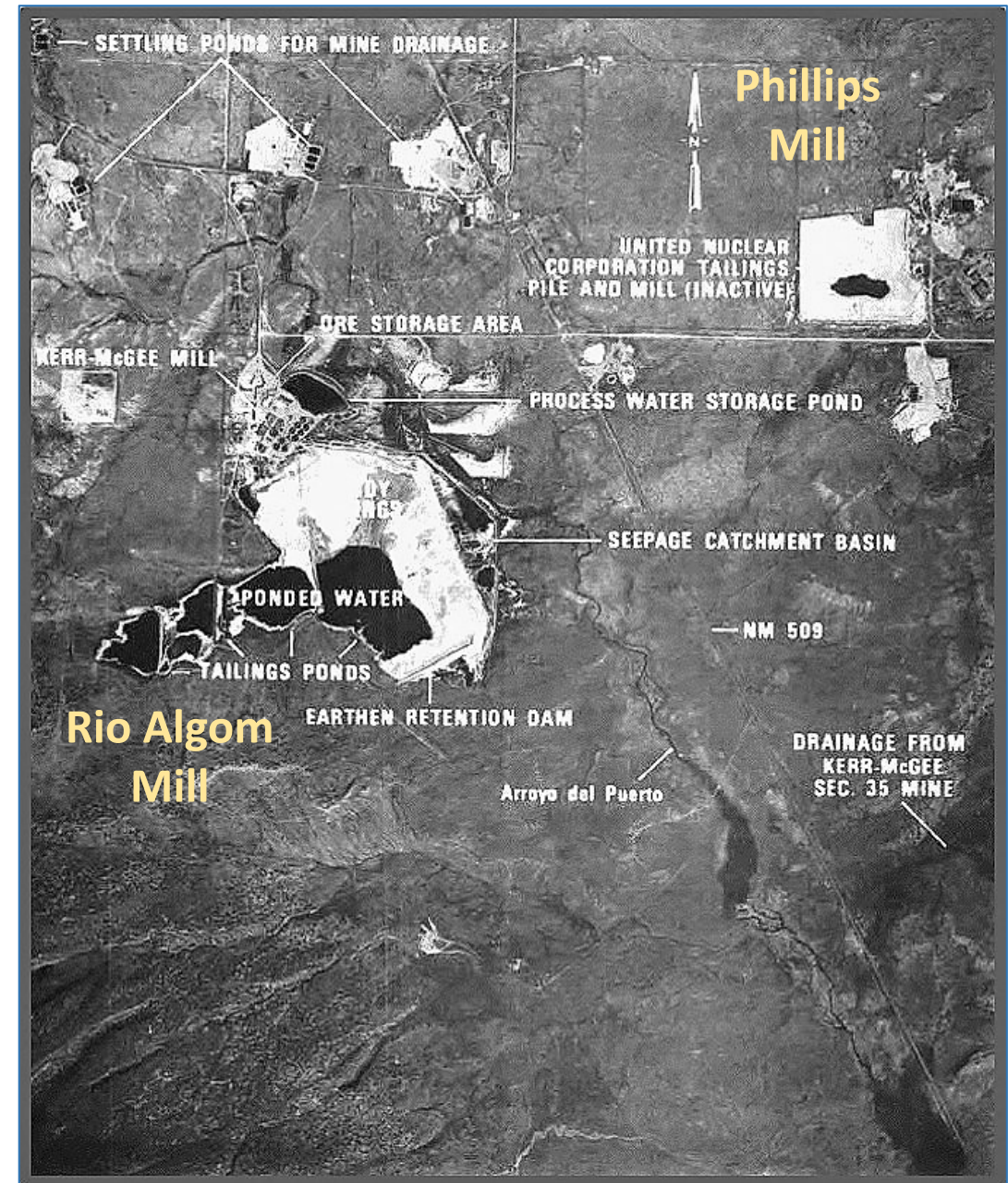
© 2016 Google

PURPOSE OF BRIEFING

- TO CONNECT HISTORICAL MINE DISCHARGE OPERATIONS TO GROUND WATER CONTAMINATION
- TOPICS TO BE DISCUSSED
 - HISTORICAL ASSESSMENT BY EPA AND NEW MEXICO
 - HYDRAULIC EFFECTS ON SURFACE DRAINAGE AND AQUIFER RECHARGE
 - MINE WATER DISCHARGE QUALITY
 - CONTAMINATION OF SHALLOW AQUIFER
 - CONTAMINATION OF BEDROCK AQUIFERS
 - ONGOING WORK AND ISSUES

URANIUM MINING INDUSTRY IMPACTS GROUND WATER

- 1975 EPA ASSESSMENT IDENTIFIES GROUND WATER CONTAMINATION
- MINE WATER DISCHARGE CREATES PERENNIAL FLOW
- ALLUVIAL GW QUALITY STANDARDS EXCEEDED (NEW MEXICO 1986)



1975 – Ambrosia Lake Area



MINE WATER DISCHARGE

Artificial
Perennial Flows
Observed to
Reached
Homestake
Impoundment
(EPA 1980)

SUMMARY OF HISTORIC MINE WATER DISCHARGE QUALITY

And Comparison to Alluvial Background Water Quality

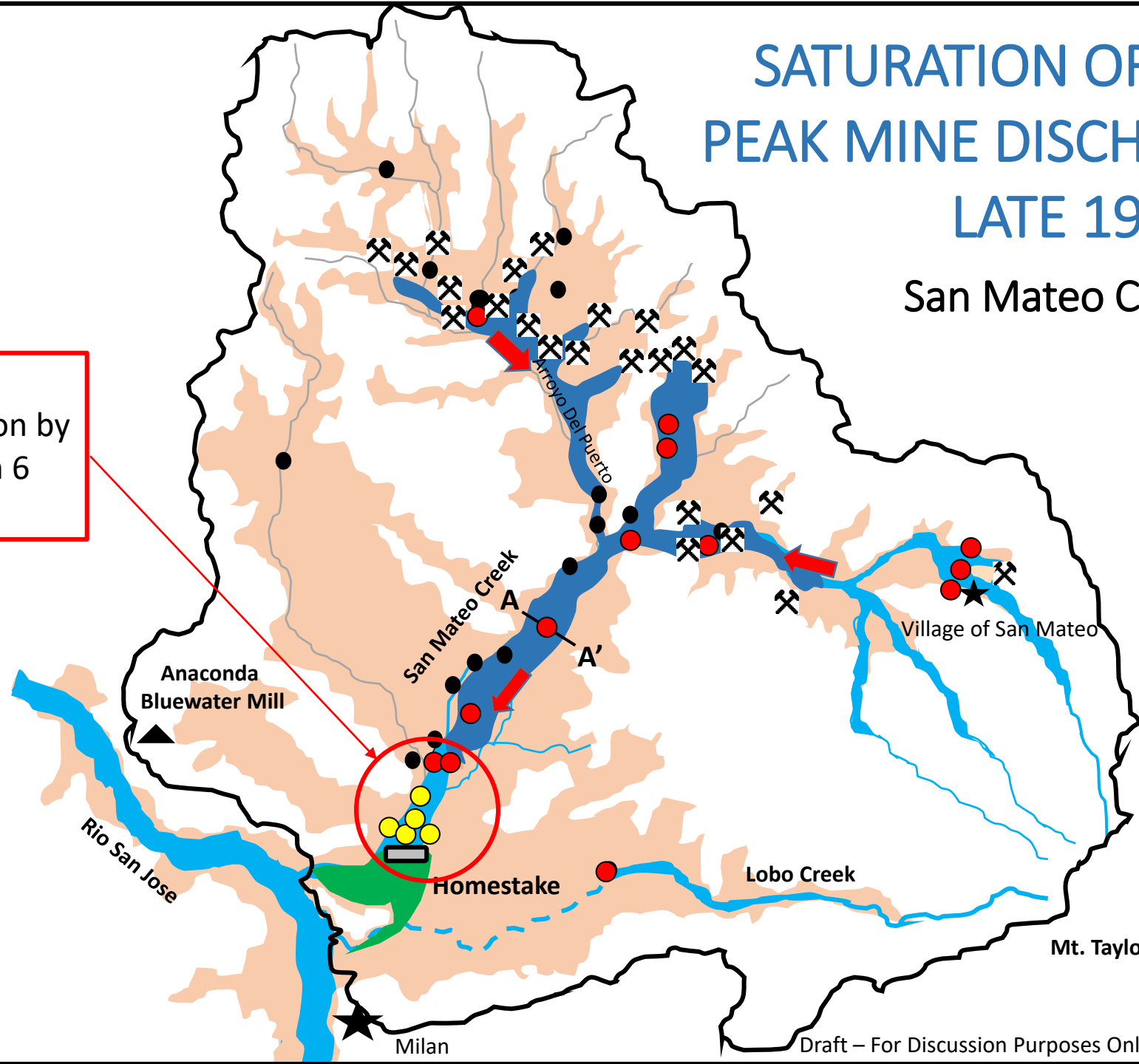
Contaminant	1981 Mine Water Discharge Ambrosia Lake Area	1981 Mine Water Discharge San Mateo Area	1978-80 San Mateo Creek Upland Alluvial GW (Background)
Gross Alpha (pCi/L)	580	1,100	2.5 – 15.0
Uranium (mg/L)	2.4	0.080	0.005 – 0.010
Selenium (mg/L)	0.410	0.040	0.005 – 0.005
Molybdenum (mg/L)	0.79	0.32	0.005 – 0.010
Chloride (mg/L)	90	10	3 – 8
Sulfate (mg/L)	837	205	5-20
Total Dissolved Solid (ppm)	1,690	520	125 – 300

New Mexico 1981 and 1986 Reports

SATURATION OF ALLUVIUM PEAK MINE DISCHARGE PERIOD LATE 1970S

San Mateo Creek Basin

Ongoing
Investigation by
EPA Region 6
and USGS



- Alluvial Aquifer
- Tailing Seepage Impacts
- Mine Discharge Water
- Alluvium
- Alluvial Monitoring Well
- Homestake Background Alluvial Monitoring Well
- Alluvial Dry Borehole
- Wet Mine
- Ground Water Flow

CROSS SECTION A - A'
CENTRAL SAN MATEO CREEK BASIN AREA

A

West

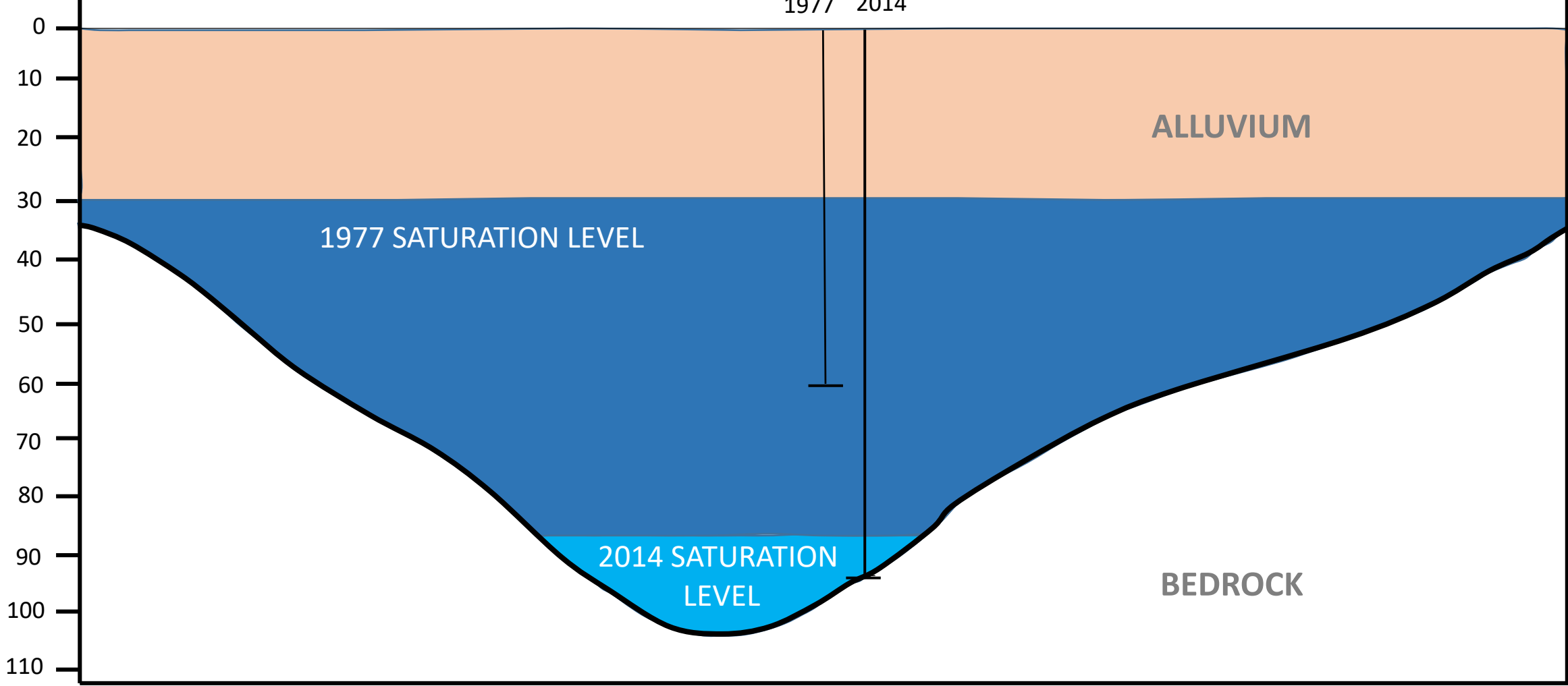
A'

East

Depth
(ft)

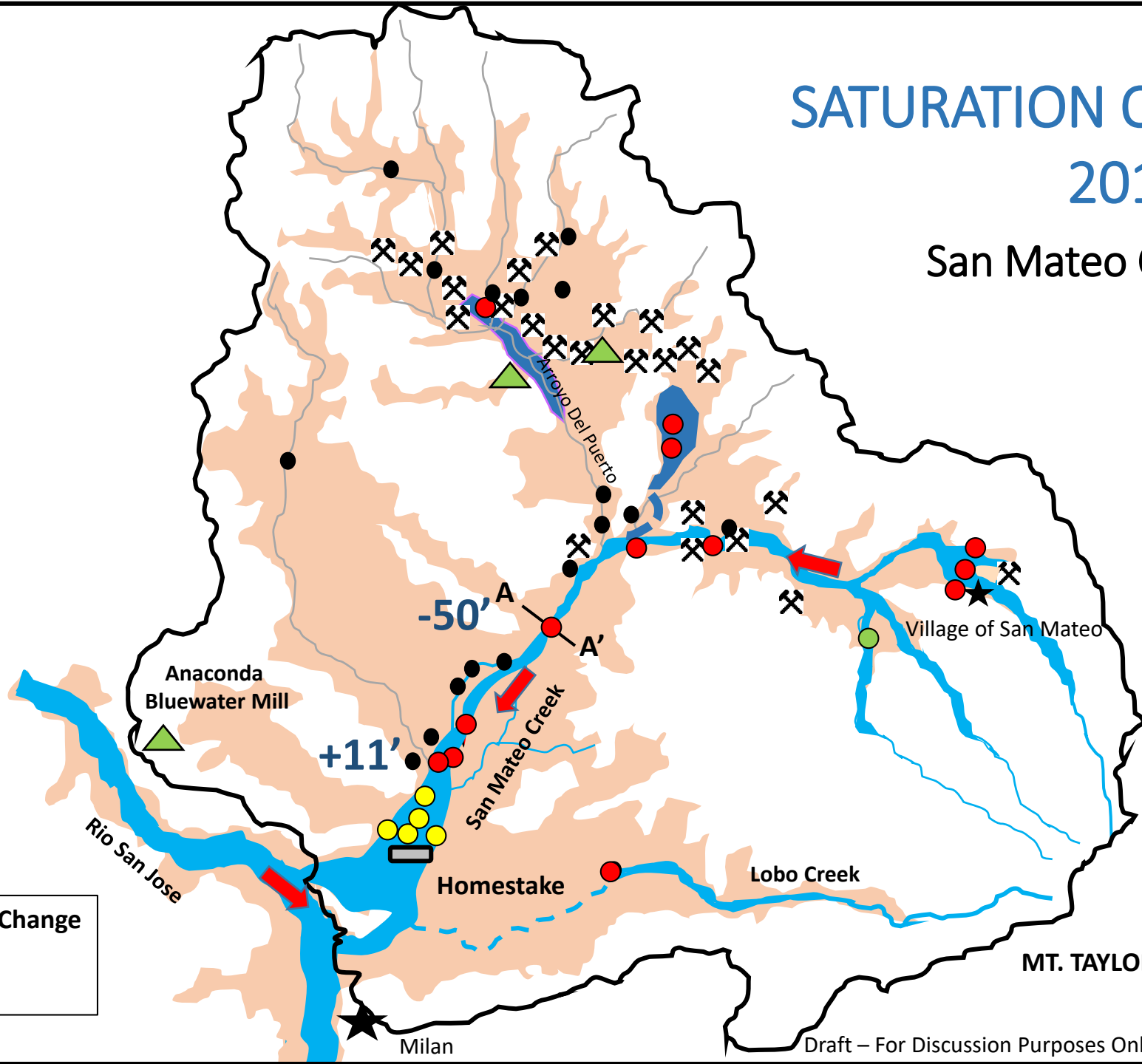
NMED
Monitoring
Well
1977

EPA Well
C-3
2014



SATURATION OF ALLUVIUM 2014

San Mateo Creek Basin



Ground Water Level Change
Since 1977
-50'

- Historic NM Background Alluvial Wells 1977
- Former Uranium Mill
- Wet Mine
- Alluvium
- Alluvial Aquifer
- Mine Discharge Water
- Alluvial Monitoring Well
- Homestake Background Alluvial Monitoring Well
- Alluvial Dry Borehole
- Ground Water Flow Direction

Draft – For Discussion Purposes Only

● Dry Borehole
⊕ Alluvial Monitoring Well
0.039 Uranium (ppm)
3,600 TDS (ppm)

ALLUVIAL AQUIFER CONTAMINATION (Uranium and TDS) 2014/15

Section 25 Mine

- United Nuclear
- Homestake
- Rio Algom

2.6 Billion Gallons Discharged

Cliffside Mine

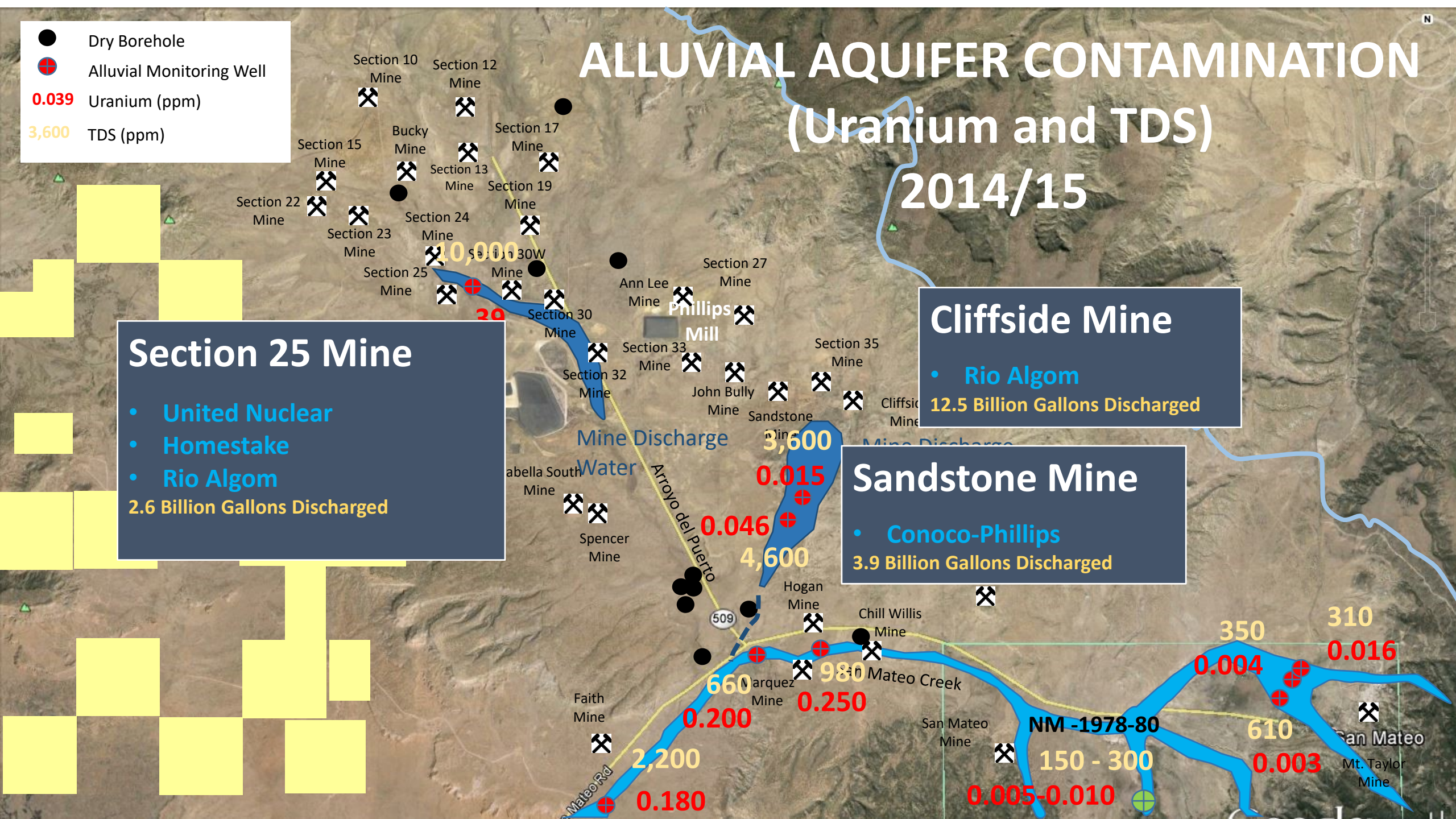
- Rio Algom

12.5 Billion Gallons Discharged

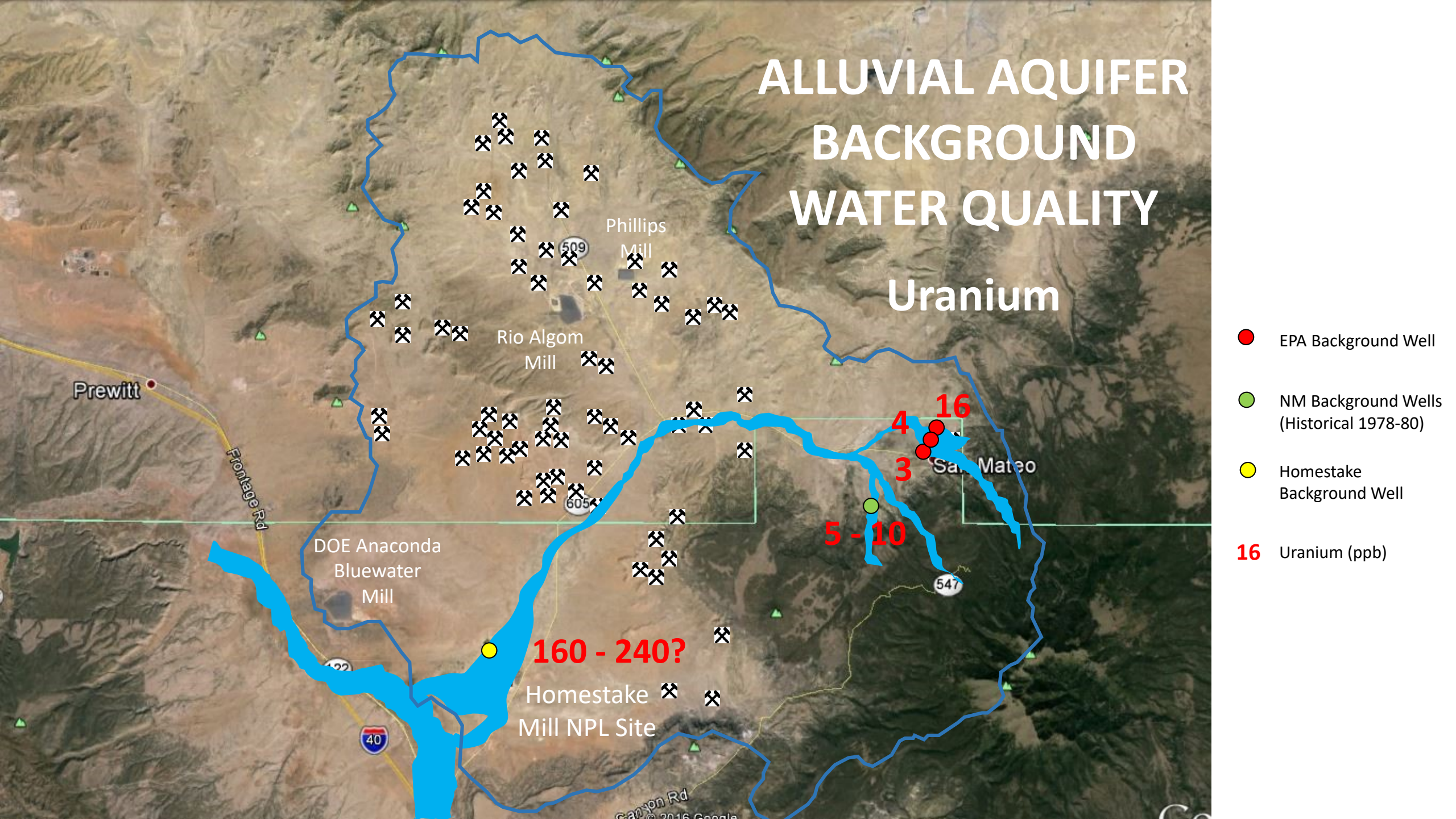
Sandstone Mine

- Conoco-Phillips

3.9 Billion Gallons Discharged

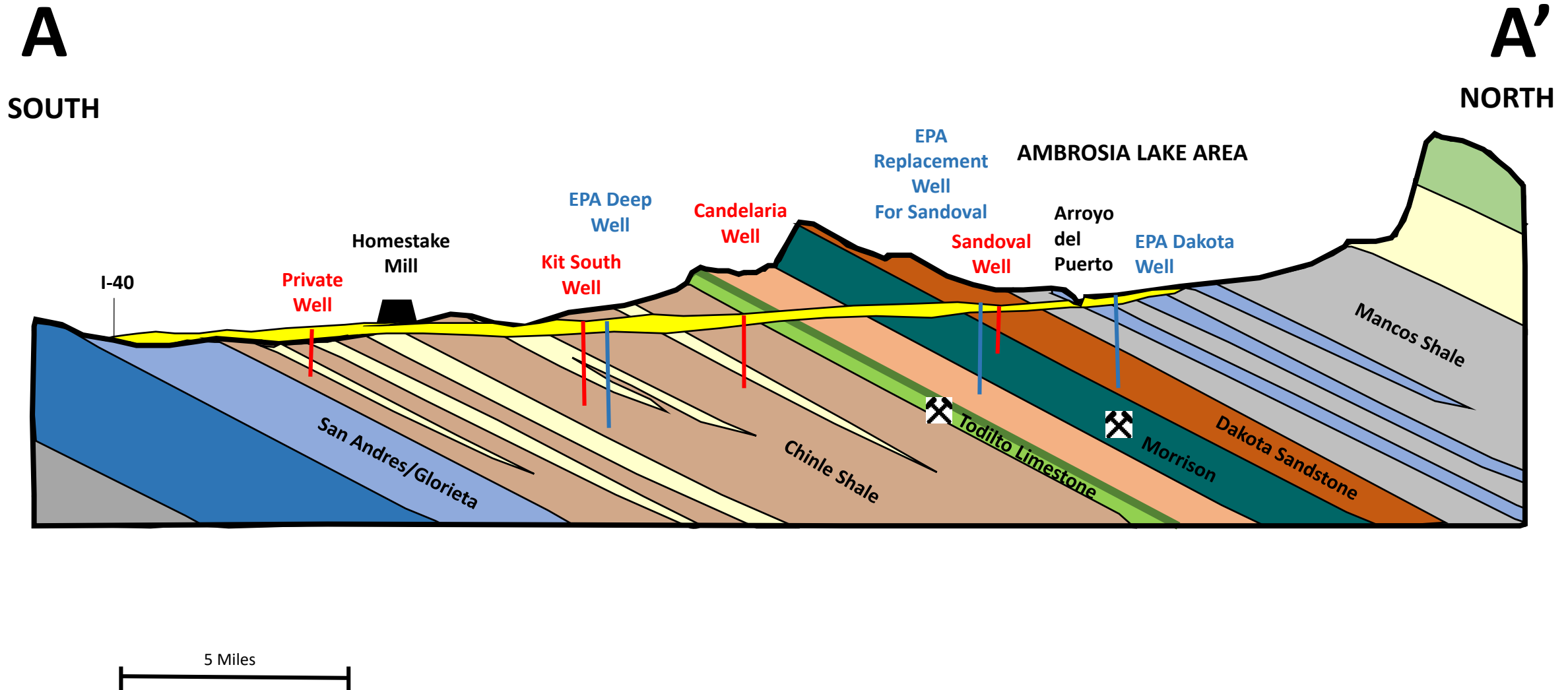


ALLUVIAL AQUIFER BACKGROUND WATER QUALITY Uranium



MULTIPLE BEDROCK AQUIFERS IMPACTED

Generalized Cross Section Through San Mateo Creek Basin



SUMMARY

- MINING INDUSTRY IMPACTED GROUNDWATER
 - Billions of gallons of mine water discharged
 - Contaminated alluvial and multiple bedrock aquifers
 - Mine water is draining out of alluvium
- EXTENT OF CONTAMINATION IN BEDROCK AQUIFERS UNKNOWN
- ISOTOPIC FINGERPRINTING ONGOING
- BACKGROUND ISSUES

EXTRA SLIDES

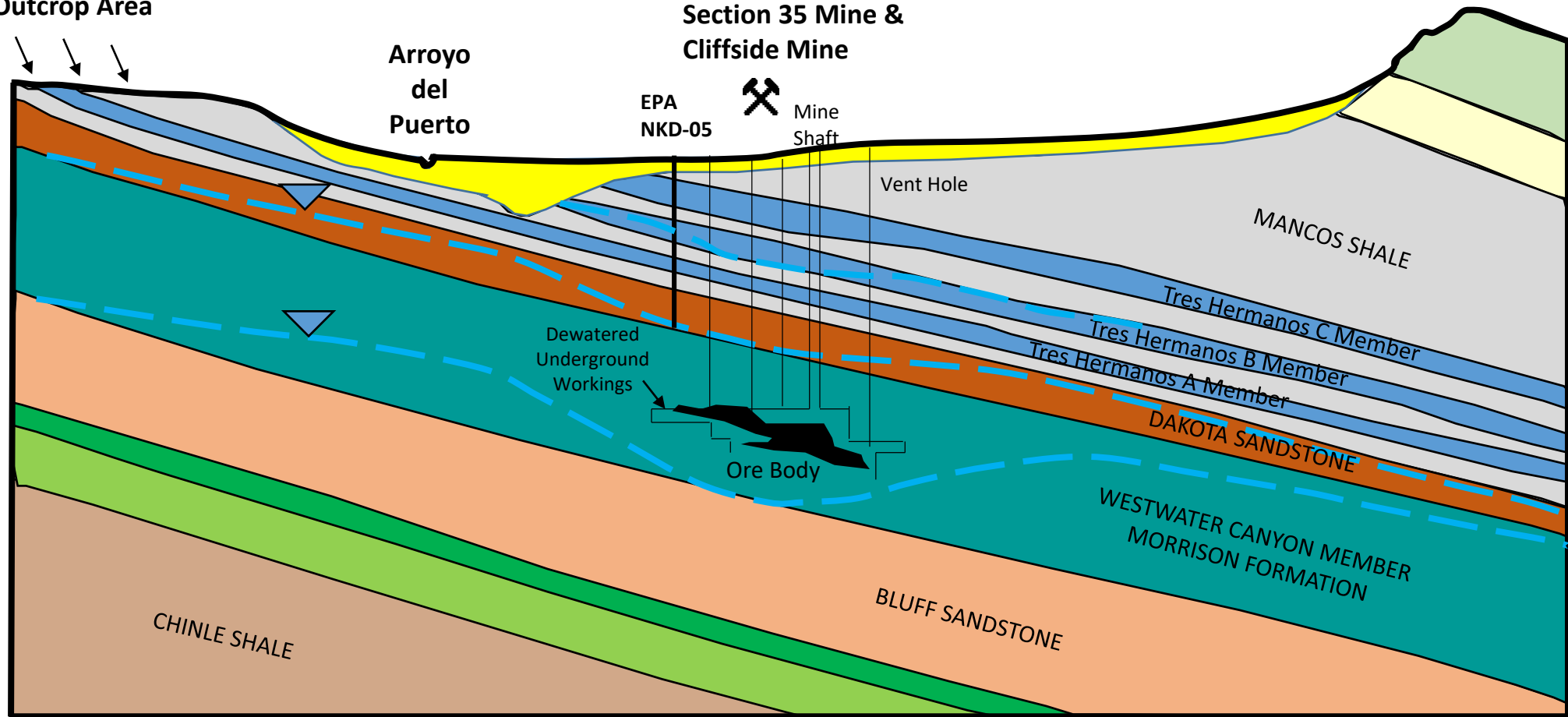
B
South

GENERALIZED CROSS SECTION B-B'

AMBROSIA LAKE AREA

B'
North

Ground Water Recharge
in Outcrop Area



Modified from Kerr McGee Nuclear Corporation, 1980

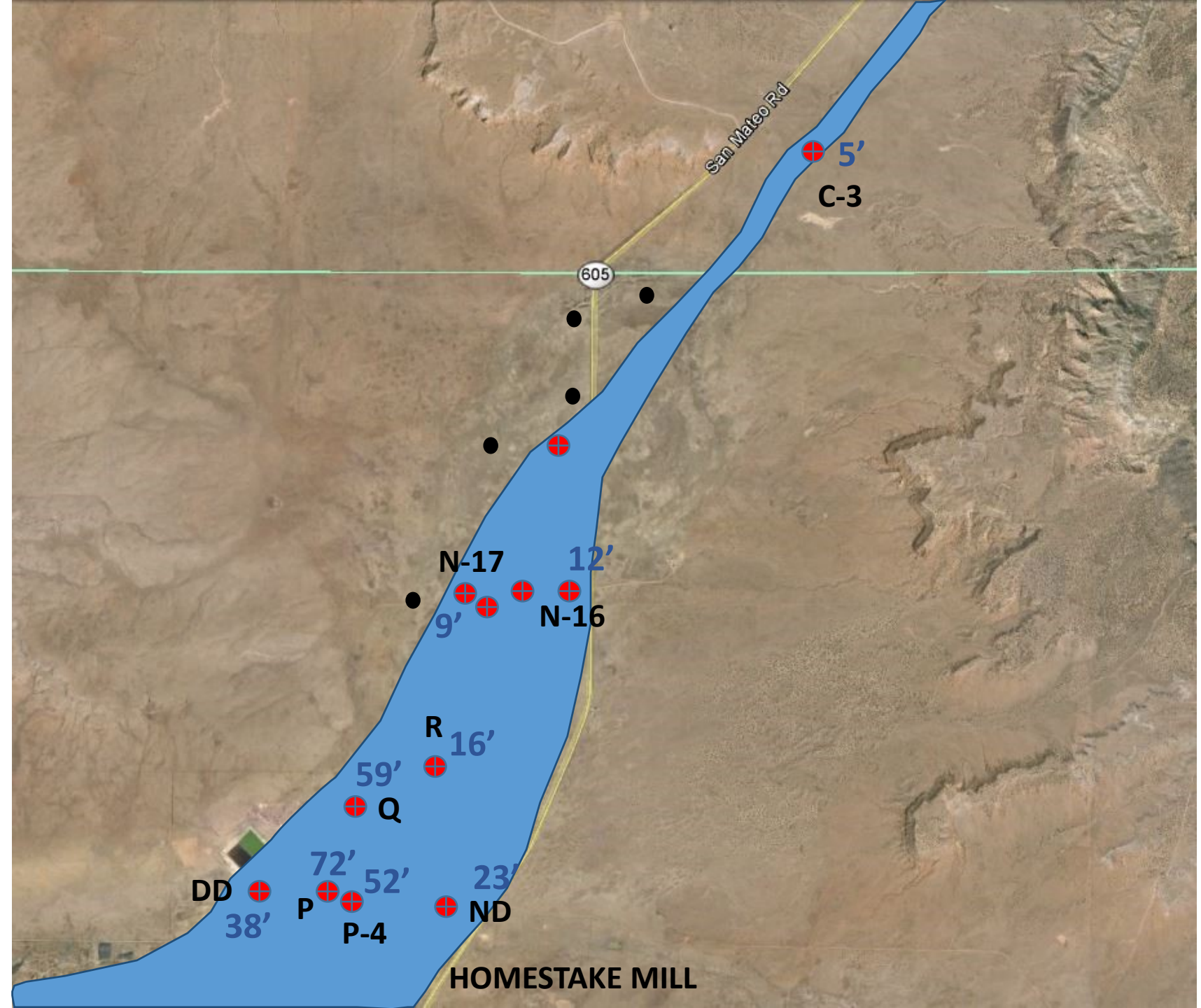
Not to Scale



Estimated Water Level

SATURATED THICKNESS OF ALLUVIAL AQUIFER NORTH OF HOMESTAKE 2015

- Alluvial Monitoring Well
- Alluvial Dry Borehole



URANIUM CONCENTRATIONS NEAR UPGRADIENT BACKGROUND WELLS

Data from Homestake 2013 Annual Report and 2003 Statistical Evaluation Report

